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## **DEPARTMENT OF CIVIL ENGINEERING**

### **QUESTION BANK**

**Name of the Faculty** : **Ms.S.Hemavathi**

**Subject** : **Concrete Technology**

**Regulation** : **2017**

**Course Code** : **CE 8404**

**Branch** : **Civil Engineering**

**Year & Semester** : **II / IV**

## CE 8404 Concrete Technology

### Course Objectives

The Student should be able

S. No.	Course Objective
1	To impart knowledge to the students on the properties of materials for concrete by suitable tests, mix design for concrete and special concretes.

### Course Outcomes:

On Completion of the course the students will be able to

CO No.	Course Outcome
1	The various requirements of cement, aggregates and water for making concrete
2	The effect of admixtures on properties of concrete
3	The concept and procedure of mix design as per IS method
4	The properties of concrete at fresh and hardened state
5	The importance and application of special concretes.

### BLOOMS TAXONOMY(BT Level)

K1-Remembering , K2-Understanding, K3-Appling, K4-Analyzing, K5-Evaluating ,K6-Creating

#### UNIT 1

#### CONSTITUENT MATERIALS

Part A		CO	BT level	Univ.QP Reference
1	Describe the role played by gypsum in the hydration reaction of cement.	C1	K1	A/M 2019
2	Define fineness modulus? Give the practical range of fineness modulus for fine aggregate.	C1	K2	A/M 2019
3	What are Bogue's compounds	C1	K1	A/M 2018
4	How do you classify aggregates based on size and shape	C1	K1	A/M 2018
5	What are the different types of test conducted on coarse aggregates?	C1	K1	A/M 2017
6	Write any two advantages of sulphate resistance cement.	C1	K2	A/M 2017

7	What are the different types of test conducted on cement?	C1	K1	N/D2016
8	Write any two advantages of Portland pozzolana cement	C1	K2	N/D2016
9	Name the major compounds of ordinary Portland cement and mention the approximate percentage of each.	C1	K2	M/J 2016
10	What should be the qualities of water to be used in concrete making?	C1	K1	M/J 2016
<b>Part B</b> <b>(Answer all the questions)</b>		<b>CO</b>	<b>BT level</b>	<b>Univ.QP Reference</b>
1	Explain the importance of the quality of water used for concreting.	C1	K2	(N/D2019)
2	Explain in detail of any three tests for coarse aggregates	C1	K2	(N/D 2019)
3	Evaluate the hydration products of cement	C1	K5	(N/D 2019) (A/M 2019)
4	What are the special application of the following cement. (i) Sulphate resisting portland cement. (ii) Low heat portland cement.	C1	K1	(A/M 2019)
5	How do you determine the crushing strength and toughness of aggregates	C1	K1	(A/M 2019)
6	Explain mechanical properties of OPC.	C1	K2	(A/M 2017) (N/D 2016)
7	Compare the physical properties of 33,43,53 grade of concrete	C1	K2	(A/M 2017) (N/D 2016)
8	Explain in detail about any four IS testing procedure for coarse aggregate	C1	K2	(A/M 2019)
9	Explain in detail the hydration mechanism of cement. Also explain how you determine the reactivity of any cementitious material.	C1	K2	(A/M 2019)
10	Classify the aggregates and reproduce its important role in concrete.	C1	K3	(N/D 2019)
11	Summarize the test procedure for water absorption and moisture content of aggregates. (N/D 2019)	C1	K2	(N/D 2019)
12	What are the initial and final setting times of cement? What is their importance	C1	K1	(N/D 2017)
13	How will you determine the compressive strength of cement? Explain briefly the procedure.	C1	K1	(N/D 2017)
14	Discuss the characteristics of good aggregate	C1	K2	(N/D 2017)
15	Briefly discuss the following tests on aggregates: specific gravity test, crushing test and impact test.	C1	K2	(N/D 2017)

16	What is the effect of water cement ratio on strength and durability of concrete	C1	K1	(A/M 2017) (N/D 2016)
17	What are the raw material for the manufacture of cement? Mention their functions in the properties of cement	C1	K1	(M/J 2016)
18	Discuss the role of various major compounds of cement and its hydrated products in the properties of cement	C1	K2	(M/J 2016)
19	Explain any two methods of finding the abrasion value of coarse aggregate	C1	K2	(M/J 2016)

UNIT 2				
CHEMICAL AND MINERAL ADMIXTURES				
Part A		CO	BT level	Univ.QP Reference
1	What is the purpose of adding an air entraining admixture to concrete?	C2	K1	A/M 2018
2	What are the desirable properties of silica fume?	C2	K1	A/M 2018
3	What are the importance of water proofers added in cement concrete	C2	K1	A/M 2017
4	Define Metakaoline	C2	K1	A/M 2017
5	Name any two chemical admixtures and their significance	C2	K2	(N/D 2017)
6	What are admixtures	C2	K1	(N/D 2017)
7	Which property of concrete can be modified by the addition of accelerators?	C2	K2	(A/M 2019)
8	Write any two brand name of water proofing chemicals	C2	K2	(A/M 2019)

9	What is meant by pozzolanic action	C2	K1	(M/J2016)
10	State the advantages of using super plasticizers in concrete	C2	K1	(M/J2016)
<b>Part B</b>		<b>CO</b>	<b>BT level</b>	<b>Univ.QP Reference</b>
1	Explain a notes on i) Accelerators and ii) Plasticizers	C2	K2	(N/D 2019)
2	Explain in detail the composition, physical properties of the silica fume and discuss how it improves the properties of concrete.	C2	K2	(N/D 2019)
3	Define the role of acclerator in concrete	C2	K2	(N/D 2019)
4	Distinguish super plasticiser and plasticizer	C2	K4	(N/D 2019)
5	Explain the effect of following I) Fly ash ii) GGBFS iii) silica fume.	C2	K2	(N/D 2019) (A/M 2018) (N/D 2017) (A/M 2017)(N/D 2016)( M/J 2016)
6	What kind of chemical admixture that can be added while concreting done under i) cold weather condition ii) hot weather condition	C2	K1	(A/M 2019)
7	Explain in details about any four mineral admixtures added in high performance concrete.	C2	K2	(A/M 2019)
8	What are the admixtures explain any four of them	C2	K1	(A/M 2018)
9	Describe the effect of following admixtures on cement concrete and give three example of each. Retarders, accelerators and water proofers.	C2	K1	(N/D 2017)
10	What are super plasticizers? How are these helpful in modifying the properties of concrete?	C2	K1	(N/D 2017)
11	Discuss briefly the effect of adding mineral admixtures to cement concrete	C2	K1	(N/D 2017)
12	Differentiate between accelerators and retarders with suitable examples and also how you can determine dosage of admixtures	C2	K3	(A/M 2017) (N/D 2016)
13	Name the various types of plasticizers used in concrete and discuss the action in detail	C2	K1	(M/J 2016)
14	List the materials used for air entrainment in concrete and describe their effects on the properties of concrete	C2	K1	(M/J 2016)

### UNIT 3

#### PROPORTIONING OF CONCRETE MIX

Part A		CO	BT level	Univ.QP Reference
1	Differentiate Design mix and nominal mix	C3	K2	(A/M 2018) (N/D 2017) (M/J 2016)
2	Give reasons for the variation in compressive strength of the samples of the same mix	C3	K2	(A/M 2018)
3	Write any four grades of cement concrete	C3	K1	(A/M 2017)
4	On what circumstances high grade concretes are utilized effectively	C3	K2	(A/M 2017) (N/D 2016)
5	Write any four methods of proportioning	C3	K1	(N/D 2016)
6	Write the concept of mix proportioning.	C3	K1	(A/M 2019)
7	List out the variables in proportioning of concrete mix	C3	K1	(A/M 2019)
8	What are the objectives of a concrete mix design	C3	K1	(M/J 2016)
9	What is the minimum grade of concrete to be used as per IS 456-2000? How surface moisture of aggregates is accounted for in the mix design?	C3	K1	(N/D 2017)
Part B		CO	BT level	Univ.QP Reference
1	What are the factors affecting the choice of mix proportions?	C3	K1	(N/D 2019)
2	What are the requirement of concrete mix design as per BIS?	C3	K1	(N/D 2019)
3	Explain the procedure of selection of constituent materials of concrete	C3	K2	(N/D 2019)
4	Design a mix to achieve the compressive strength as 35Mpa at 28 days curing period with the following material properties. Specific gravity of cement = 3.15, specific gravity of Msand = 2.64, specific gravity of coarse aggregate = 2.70, moisture content in Msand = 3.2%, Moisture content in coarse aggregate = 1.8%	C3	K6	(N/D 2019)
5	Design a mix to achieve the compressive strength as 45Mpa at 28 days curing period with the following material properties. Specific gravity of cement = 3.14, specific gravity of Msand = 2.68, specific gravity of coarse aggregate = 2.74, moisture content in fine aggregate = 2.84%, Moisture content in coarse aggregate = 1.75%, water absorption of fine aggregate = 3.42%, water absorption of coarse aggregate = 2.04%	C3	K6	(N/D 2019)
6	Explain step by step procedure of concrete mix design recommended by IS method	C3	K2	(A/M 2019)(A/M 2018)
7	Explain how you modify the concrete mix design when : i) Fly ash used in the mix II) Super plasticizer is used in mix.	C3	K2	(A/M 2019)
8	Design the concrete mix by IS method for the following requirements: Characteristic compressive strength at 28 days = 25 N/mm <sup>2</sup> , Maximum nominal size of aggregate = 20mm , shape of aggregate = angular, degree of workability, slump of concrete = 50mm , type of exposure = mild, test data for concrete making materials: Specific gravity : cement = 3.15, coarse aggregate = 2.7 and fine aggregate = 2.6, water	C3	K6	(N/D 2017)

	absorption: coarse aggregate = 0.5%, fine aggregate = 1%			
9	Arrive the mix proportion for M20 concret (RCC) exposed to mild condition by IS method using folloewing details. I) Max nomial size of aggregate : 20mm ii) degree of workability : 75mm slump iii) degree of exposure : mild iv) method of concrete placing : normal v) shape of coarse aggregate : angular vi) degree of quality control : good <b>data on materials</b> : I) type of cement : OPC grade 43 ii) specific gravity of cement : 3.15 iii) specific gravity of FA & CA : 2.65,2.7 respectively iv) free surface moisture : Nil for CA & FA v) Fine aggregate : confirming to grading zone II of table 4 of IS 383.	C3	K6	(A/M 2019)
10	Define concrete mix design and state the principles of concrete mix design.	C3	K1	(N/D 2017)
11	List tge various methods of mix design. Briefly describe the IS method	C3	K2	(N/D 2017)
12	Design the concrete mix by IS method for the following requirements: Characteristic compressive strength at 28 days = 25 N/mm <sup>2</sup> , Maximum nominal size of aggregate = 20mm , shape of aggregate = angular, degree of workability, slump of concrete = 50mm , type of exposure = mild, test data for concrete making materials: Specific gravity : cement = 3.15, coarse aggregate = 2.7 and fine fine aggregate = 2.6, water absorption: coarse aggregate = 0.5%, fine aggregate = 1%	C3	K6	(N/D 2017)
13	Design a concret mix for M40 grade of concrete using IS method with the folloeing data: i) type of cement = OPC 43 grades, ii) Maximum size of aggregate = 20mm, iii) exposure condition = severe (RCC) iv) workability = 125mm slump v) minimum cement content = 320 kg/m <sup>3</sup> vi) Maximum W/c = 0.45 vii) Method of placing concrete = pumping viii) Degree of supervision = good ix) type of aggregate = crushed angular aggregate x) super plasticizer will be used xi) Specific gravity of coarse aggregate = 2.80 xii) Specific gravity of fine aggregate = 2.70 xiii) water absorption : coarse aggregate = 0.5%, fine aggregate = 1%. Grading of coaesr aggregate is confirming to table 2 of IS 383 and grading of fine aggregate is falling in zone II	C3	K6	(A/M 2017), (N/D 2016)

#### UNIT 4

#### FRESH AND HARDENED PROPERTIES OF CONCRETE

Part A		CO	BT level	Univ.QP Reference
1	List the factors affecting workability of concrete	C4	K2	(A/M 2018) (N/D 2017)
2	Name any four properties of hardened concrete	C4	K2	(A/M 2018)
3	What are the advantages of ring tension test?	C4	K1	(A/M 2017) (N/D 2016)
4	Define bleeding	C4	K1	(A/M 2017) (N/D 2016)
5	Mention the factors which affect the strength of concrete	C4	K2	(N/D 2017)
6	Why is the age factor not taken advantage of in IS: 466-2000?	C4	K1	(A/M 2019)

7	What kind of slump observed in slump cone test?	C4	K1	(A/M 2019)
8	Why does a Concrete cylinder fail at a lower stress than a concrete cube?	C4	K1	(M/J 2016)
9	What are the effect of water cement ratio on concrete strength and durability.	C4	K1	(M/J 2016)
<b>Part B</b>		<b>CO</b>	<b>BT level</b>	<b>Univ.QP Reference</b>
1	Explain in detail any two tests for fresh concrete.	C4	K2	(N/D 2019)
2	Illustrate stress strain curve for concrete and explain all salient features	C4	K2	(N/D 2019)
3	Explain in detail about the following fresh concrete properties i) compaction factor ii) Vee Bee consistancy iii) slump	C4	K2	(N/D 2019)
4	Define the following hardened concrete properties i) Permeability ii) water absorption iii) Acid resistance	C4	K1	(N/D 2019)
5	What is meant by bleeding and segregation of concrete? What are the effects of bleeding and segregation in concrete? State the control measures to be taken to control it.	C4	K1	(A/M 2019) (N/D 2017)
6	Explain in detail factors influencing the strength of concrete	C4	K2	(A/M 2019) (A/M 2017)
7	How do you determine the fresh concrete properties? Explain any two in detail	C4	K1	(A/M 2018)
8	Explain the IS procedure for determination of compressive and flexural strength of concrete	C4	K2	(A/M 2018)
9	Draw stress strain curve for concrete and explain all salient features	C4	K2	(N/D 2019)
10	Describe the following hardened concrete properties i) Permeability ii) water absorption iii) Acid resistance	C4	K1	(N/D 201\j9)
11	What is meant by workability ? how is it tested in field and laboratory	C4	K1	(N/D 2017)

**UNIT 5**  
**SPECIAL CONCRETES**

<b>Part A</b>		<b>CO</b>	<b>BT level</b>	<b>Univ.QP Reference</b>
1	List any two applications of Heavy weight concrete	C5	K2	(A/M 2018)
2	Write short note on Shortcrete	C5	K1	(A/M 2018)
3	Enumerate SIFCON.	C5	K2	(A/M 2017) (N/D 2016)
4	Write any two advantages of geopolymer concrete	C5	K1	(A/M 2017)
5	What is light weight concrete ?	C5	K1	(N/D 2017)
6	What ia ferrocement?	C5	K1	(N/D 2017)



7	How geopolymer concretes is more advantage than cement concrete in construction industry?	C5	K1	(N/D 2016)
8	What are the applications of light weight concrete?	C5	K1	(A/M 2019)
9	What are the different types of polymers added in concrete?	C5	K1	(A/M 2019)
10	Define High performance concrete	C5	K1	(M/J 2016)
<b>Part B</b>		<b>CO</b>	<b>BT level</b>	<b>Univ.QP Reference</b>
1	In what way the behaviour of FRC can be used for seismic resistant design? Explain.	C5	K1	(N/D 2019)
2	Define the procedure of shotcrete.	C5	K1	(N/D 2019)
3	Define in detail about fresh concrete properties of self compacting concrete	C5	K1	(N/D 2019)
4	Explain about properties of high performance and polimer concrete and its application.	C5	K2	(N/D 2019) (A/M 2019)(A/M 2018)(N/D 2017)
5	Explain a short note on i) structural light weight concrete ii) ferro cement	C5	K2	(A/M 2019) (N/D 2017)
6	what is meant by fibre reinforced concrete? Explain in detail about the materials used, method of production and its advantages over the conventional concrete.	C5	K1	(A/M 2018) (N/D 2017)
7	Brief the production of geo polimer concrete and enlist the salient parameters affecting the compressive strength of geopolymer concrete.	C5	K1	(M/J 2016)
8	Explain a short note on i) shotcrete ii) SIFCON iii) Ready mixed concrete iv) Ferrocement	C5	K2	(M/J 2016)

\*\*\*\*\*ALL THE BEST\*\*\*\*\*

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